R E P O R T R E S U M E S

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ATTENTIONAL PROCESSES IN READING--THE EFFECT OF PICTURES ON THE ACQUISITION OF READING RESPONSES.

BY- SAMUELS, S. JAY

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DESCRIPTORS- *ATTENTION, *PREREADING EXPERIENCE, *PICTORIAL STIMULI, *READING RESEARCH, READING INSTRUCTION, ASSOCIATIVE LEARNING, UNIVERSITY OF MINNESOTA,

THE HYPOTHESIS TESTED WAS THAT WHEN PICTURES AND WORDS ARE PRESENTED TOGETHER, THE PICTURES MAY MISCUE AND DIVERT ATTENTION, AND THEREBY INTERFERE WITH THE ACQUISITION OF READING RESPONSES. IN EXPERIMENT 1, 30 RANDOMLY ASSIGNED PRE-FIRST GRADERS LEARNED TO READ FOUR WORDS WITH NO PICTURES, A SIMPLE PICTURE, OR A COMPLEX PICTURE PRESENT. DURING ACQUISITION TRIALS, WHEN PICTURES WERE PRESENT, THE SIMPLE AND COMPLEX PICTURE GROUPS MADE MORE CORRECT RESPONSES. DURING TEST TRIALS, WITH NO PICTURES PRESENT, THE NO-PICTURE GROUP EXCELLED. IN EXPERIMENT 2, 26 MATCHED PAIRS OF FIRST GRADERS WERE GIVEN CLASSROOM READING INSTRUCTION UNDER A NO-PICTURE OR PICTURE CONDITION. THE RESULTS DISCLOSED THAT POOR READERS WITH NO PICTURE PRESENT LEARNED MORE WORDS. AMONG BETTER READERS THE DIFFERENCE WAS NOT SIGNIFICANT. TABLES AND REFERENCES ARE INCLUDED. THIS PAPER WAS PRESENTED AT THE AMERICAN EDUCATIONAL RESEARCH ASSOCIATION CONFERENCE (NEW YORK, FEBRUARY 1967). (RH)

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Achievement Programs in Reading: The Effect
of Teachers on the Acquisition of Reading Responses
in Boys
University of Wisconsin

Abstract

Children may be said to acquire both the verbal stimuli and a means by which the children may obtain and then obtain information from printed materials, by responding to these verbal stimuli in certain specified ways. Some boys with low reading achievement, in a reading class, in a regular school program [illegible] with the program. The purpose and results of the experiment were reported. [illegible]

An experiment to investigate the effects of three teaching methods was carried out. Each method [illegible] a completion of primary education. The three methods were [illegible] boys in a regular school program. Two of the methods [illegible] the differences were very significant.

[illegible] were discussed in terms of theoretical principles.

Attentional Processes in Reading: The Effect of Pictures on the Acquisition of Reading Responses

F. Jay Samuels

University of Minnesota

Psychologists have long been aware of the central role of attentional processes upon learning. Pavlov and his assistants found that in order to elicit overtly conditioned salivary responses stimuli which competed for the animal's attention had to be eliminated. To accomplish this, they worked in a specially constructed soundproofed building with partitions separating experimenter and subject. The mere presence of an experimenter in the room of investigation during experimentation markedly prolonged the conditioning procedure (Osgood, p. 71, 1953). Sokolov and Vaggley (1963) have noted that presentation of unconditioned stimuli produces an effect resembling a reduction in the intensity of the stimulus. Kalsbeek (1964) investigated the deterioration of performance caused by distraction. He found that requiring subjects to attend to visual and auditory cues with their speed and accuracy of performance on a visual vigilance task has been found to interfere with the recall of contextual material (Hockey and Hamilton, 1967). Brown and Charlton (1965) presented distracting meaningful and meaningless auditory material and found that performance on a subject matter task was affected more by the meaningful than by the meaningless stimuli.

One manner in which a person responds to distracting background stimuli seems to be implicated in reading disability (Santostefano, Rutledge, and Randall, 1963). It seems that the performance of the underachievement emergency

greater disruption under conditions of distraction than does the performance of the capable student (Silverman, Davis, and Andrews; Baker and Kadell, 1960). Although some classes of extraneous stimuli interfere with the learning process, this need not necessarily be the case. Some extraneous stimuli such as verbal directions focus the learner's attention on the relevant elements in the stimulus complex (Berlyne, p. 43, 1960).

The purpose of the present study was to test the hypotheses that when pictures and words are presented together, the pictures would function as distracting stimuli and interfere with the acquisition of reading responses. Pictures may be used as prompts when the reader cannot read a word in the text, but pictures may distract and divert attention from the careful use of attending to the printed words.

Experiment One.

Method

Subjects. Thirty children who had kindergarten experience and who were enrolled in a pre-first grade summer program were randomly assigned to one of three experimental treatments. The subjects were pre-tested to ensure that no one was able to read the words used in the experiment.

Design. A simple, randomized design was used. Ten subjects were randomly assigned to the no-picture, ten to the simple-picture, and ten to the complex-picture condition.

Materials. The pre-test materials consisted of four 3 x 5 inch index cards with either "boy," "bed," "pen," or "car" typed on them. There was one word typed on each card.

For the warm-up trials, four novel, nonsense figures that had been created

for a study on reading were used (Jeffrey and Samuels, 1966). The figures were highly discriminable from each other and sufficiently dissimilar from letters in the Roman alphabet to make generalization from the other unlikely. The figures were placed on 5 x 8 inch index cards, one to a card. The subjects had to learn to associate a number with each figure. The numbers were 1, 2, 3, and 4.

For the experiment proper, a primary typewriter was used to type the words, boy, bed, man, and car at the bottom of 5 x 8 inch index cards, one word to a card. The same words were presented in the no-picture, simple-picture, and complex-picture conditions.

For learning trials in the no-picture condition, there was a word at the bottom of each card but no picture was present.

For learning trials in the simple picture condition, the words were typed at the bottom of each card as in the no-picture condition. Above each word was a simple black and white drawing portraying the object that the word-symbolized. Previous work with the pictures indicated they could reliably elicit the same verbal response as was typed at the bottom of the card.

For learning trials in the complex-picture condition, the words were typed at the bottom as in the no-picture condition. Above each word was a colorful picture which had been cut out of a reading primer. The pictures were complex in that they pictorially represented more than the word which was at the bottom of the card. For example, the picture attached to the card with the word "boy" at the bottom showed a boy holding his dog. The boy was pointing to a horse in the background.

The cards used for the test trials were the same for all conditions. As

the bottom of the rest cards the four words, "boy," "bed," "man" and car" were typed in lower case with the primary typewriter, one word to a card. There were no pictures on any of the test cards.

Procedure

The experimenter worked individually with the subjects during all phases of the procedure. A pre-test was given to each subject. The subject was told, "Today, we are going to play a game. In this game we are going to learn some words. First, let us see if you already know what the names of the words are." The four words were shown to the subject. If he was able to read any of the words, he was eliminated.

Following the pre-test a warm-up was given to each subject to acquaint him with the nature of the learning task. The subject was told, "Before we learn the new words, let us practice on some numbers. I will show you a card with a funny looking number on it and I want you to tell me what the number is. If you don't know the number's name I will tell you what it is. You should try to tell me what the number is before I tell you. Do you understand what we are to do? All right? Then, what do you do when I show you a card with a number on it?" Each card was shown to the subject for an approximate four-second interval. At the end of the anticipation interval the subject was told the number. The cards were presented in three random orders. Each subject was given six warm-up trials.

When the warm-up was over, the subject was given the first learning trial. He was told, "All right now let us see how we can learn the new words. I will show you a card with a word on it and I want you to tell me what the word's name is. If you don't know the word's name I will tell you. You should try to tell

me the name before I tell you. Do you understand?" Each card was shown to the subject for four seconds. Then he was told the name. The subject was scored for a correct response if he said the appropriate word before feed-back was given.

Following the first acquisition trial, the first test trial was given. The test card was presented for four seconds and the subject had to give the correct response during this interval. No feed-back was given during test trials. Acquisition trials and test trials were alternated. Each subject received ten learning trials and ten test trials. The stimuli for all phases of the procedure were presented in three random orders.

Results

Separate analyses were computed for responses during acquisition trials and for responses during test trials. During acquisition trials pictures were present as incidental cues for the picture conditions. During test trials pictures were not present.

On the acquisition trials, as seen in Table 1, the mean number of correct responses given for the no-picture condition was 25.30; for the complex picture condition it was 36.90; and for the simple-picture condition it was 39.40. Comparing the simple-picture to the no-picture condition during acquisition, subjects in the simple-picture condition gave significantly more correct responses ($t=9.02$, $df=18$, $p<.01$). Comparing the complex-picture to the no-picture condition, subjects in the complex-picture condition gave significantly more correct responses ($t=7.42$, $df=18$, $p<.01$).

Insert Table 1 about here

On the test trials, where incidental cues were absent for all conditions the no-picture group excelled. As seen in Table 2, the mean number of correct responses given on the tests by subjects in the no-picture condition was 19.20; for subjects in the simple picture condition it was 11.30; and for subjects in the complex-picture condition it was 11.60. Comparing the simple-picture to the no-picture condition on the test trials, subjects in the no-picture condition recognized significantly more words ($t=4.02$, $df=18$, $p<.01$). Comparing the complex-picture of the no-picture condition, subjects in the no-picture condition recognized significantly more words ($t=3.57$, $df=18$, $p<.01$).

Insert Table 2 about here

Experiment Two.

Method

Subjects. Fifty-two students from a Minneapolis public school with seven months' first grade experience were used as subjects.

Design. A treatment by levels design was used. The subjects were divided into two matched groups. There were 26 subjects in the picture and 26 subjects in the no-picture condition. Half the subjects in each condition were designated as above and the other half as below the median based on pre-test scores.

Materials. The reading material for the no-picture and picture condition was the same. A story called "Fun at Blue Lake" was written. It was 106 words long and contained 50 different words. The words were typed in large type and mimeographed.

A book was made for each subject. The story, "Fun at Blue Lake," was

pasted on the right face of the book for both conditions. Subjects in the picture condition had a picture from a reading primer pasted on the left face of the book. The picture showed a cabin in the woods with a lake in the foreground. At the lakeshore was a family and their dog. In the no-picture condition the left face of the book was blank. When the books were opened subjects in the picture condition saw the text on the right and a picture on the left. Subjects in the no-picture condition saw a blank page on the left and the text on the right.

Procedure

Several days before the experiment proper was run, the subjects were pre-tested on the 50 words used in the story. The pre-test consisted of showing each of the 50 words used in the story to the subject. Each word was typed on a 3 x 5 index card and exposed one at a time to the subject, allowing ten seconds for a response. Subjects were then matched on pre-test scores and randomly assigned to either the picture or no-picture condition.

Reading instruction was given to both conditions simultaneously. The groups were separated in the room so that subjects in the no-picture condition were unable to see the pictures of the subjects in the picture condition. Reading instruction was given to small groups. At no time were there more than eight subjects in the room. The instructional procedure paralleled that used in typical classrooms. Instruction consisted of motivating and building background for the story, reading for a purpose, silent reading, and then oral reading. The subjects were instructed to raise their hands during silent reading if they were unable to read any word. The experimenter went about whispering the words to the children who requested help. The experimenter was careful

to give help to students in both groups and both groups were given opportunities to read aloud.

Immediately following reading instruction, the subjects were given the post-test. They were tested by four assistants on the 50 words used in the story in a similar manner to that which was used in the pre-test.

Results

Two comparisons were made to test differences in word recognition on the post-test. In the first comparison, as seen in Table 3, above median subjects in the picture condition recognized a mean of 43.15 words while above median subjects in the no-picture condition recognized a mean of 42.08 words. This difference was not significant. In the second comparison, below median subjects in the picture condition recognized a mean of 23.69 words, while below median subjects in the no-picture condition recognized a mean of 26.23 words. This difference was significant ($t=2.73$, $df=12$, $p<.01$, one tail).

Insert Table 3 about here

Discussion

The purpose of experiments one and two was to test the hypothesis that when related pictures and words are presented together, the presence of pictures retards the acquisition of reading responses. Experiment one was designed as a laboratory study to test the effect of pictures on naive subjects under conditions unlike those found in classrooms. Experiment two was designed to test the effect of pictures on less naive subjects using a procedure which was similar to that used in classrooms.

In experiment one, during the ten acquisition trials, when pictures were available as incidental cues for appropriate verbal responses for subjects in the picture conditions, subjects in these conditions gave significantly more correct responses than did subjects in the no-picture condition. On the ten critical test trials when pictures were not available as incidental cues, subjects in the no-picture condition gave significantly more correct responses. Acquisition and test trials were purposely alternated so that subjects in the picture conditions would be aware that the printed words were important stimuli. Despite the alternation of acquisition and test trials, subjects in the picture conditions tended to use pictures rather than words for cues. It would appear that pictures functioned as distracting stimuli in that they drew attention away from the printed words. Underwood (1963) and Samuels and Jeffrey (1966) report that in paired-associate learning, under certain conditions a subject may extract from the stimulus complex a single element to which the response was attached. When the stimulus complex is presented, the subject may give the correct response, but for the wrong reasons. For example, when presented h-o-r-s-e the child says "horse". He may have attached the response to the letter "h," however. When the stimulus h-o-u-s-e is presented, he says "horse" since he attends only to one letter.

In experiment two no significant difference was found in reading acquisition between the picture and no-picture conditions among the better readers. Among the poorer readers, subjects in the no-picture condition learned to read significantly more words than did subjects in the picture condition. The results of experiment two support the findings of Silverman, Davids, and Andrews (1963) and Baker and Madell (1965) in that performance of the less capable

student was affected more by distracting stimuli than was the performance of the more capable student.

Several questions are raised by this study. Considering the effect which pictures had on reading acquisition of naive and less capable students, one may wonder if it is good practice to put pictures in reading primers. Another question left unanswered is how does the more capable student use pictures when they are available. It would seem advisable to continue the investigation of the role of pictures in readers in terms of motivation, student attitude towards reading, and attentional processes.

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Table 1

Means and Standard Deviations for

Treatments on Acquisition Trials

	Treatment		
	No-picture	Simple-picture	Complex-picture
M	25.30	39.40	36.90
SD	7.23	1.26	6.34

Table 3

Yield and Standard Deviation

for Treatments Plus Yields

Treatment		

Table 3

Means and Standard Deviations for Above and Below Median Subjects for Treatments

	Treatment			
	Movies		No-pictures	
	Above Mdn.	Below Mdn.	Above Mdn.	Below Mdn.
M	42.00	23.69	43.15	26.23
SD	4.81	1.69	4.05	18.46